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Atypical osteoid osteoma mimicking stress fracture in elderly female: a case report

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ABSTRACT

Background: Osteoid osteoma is a benign bone tumor that typically affects young males. Its occurrence in older females is rare, often leading to diagnostic challenges due to atypical clinical and radiological features.

Case presentation: A 55-year-old female presented with a 6-month history of progressive nocturnal pain in the right thigh, which was partially relieved by nonsteroidal anti-inflammatory drugs. Initial X-ray imaging revealed subtle cortical lucency with mild surrounding sclerosis, initially suggestive of a stress fracture.

Investigations: Three-phase bone scintigraphy demonstrated focal increased uptake in the affected region. Subsequent SPECT/CT imaging confirmed increased Technetium-99m Methylene Diphosphonate uptake corresponding to a cortical nidus with central lucency and peripheral sclerosis, consistent with osteoid osteoma.

Diagnosis: Based on clinical presentation and imaging findings, a diagnosis of osteoid osteoma of the right femur was established.

Discussion: This case underscores the diagnostic difficulty of osteoid osteoma in older adults, where the presentation may mimic stress fractures or other cortical lesions. Advanced imaging modalities such as SPECT/CT play a crucial role in accurate lesion localization and differentiation from other pathologies.

Conclusion: Recognition of atypical presentations of osteoid osteoma in older adults is essential to avoid misdiagnosis and unnecessary interventions. Advanced imaging techniques are invaluable for confirming the diagnosis and guiding appropriate management.

Keywords: Osteoid osteoma, elder female, bone scintigraphy, SPECT/CT, stress fracture, cortical nidus.

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Introduction

Osteoid osteoma represents about 10% of all benign bone tumors and most commonly affects young males in their second or third decade of life [1]. Its occurrence in older females is uncommon, making diagnosis more challenging because the presentation may be atypical. Lesions in the midshaft of the femur can easily be confused with stress fractures, especially when plain radiographs show only subtle cortical lucency [2]. Precise diagnosis is essential to avoid unnecessary procedures and prolonged discomfort. Advanced imaging techniques, such as three-phase bone scintigraphy and SPECT/CT, play a key role in identifying small cortical nidus lesions and in distinguishing OSTEOID OSTEOMA from stress fractures or other cortical abnormalities [3,4].

Case Presentation

A 55-year-old female was referred to the nuclear medicine Outpatient Department for bone scintigraphy. She presented with a 6-month history of gradually worsening pain in her right thigh, which was more severe at night and partially relieved by nonsteroidal anti-inflammatory drugs (NSAIDs). She had no history of trauma or prior surgery. On physical examination, tenderness was localized over the midshaft of the right femur, with no swelling, redness, or deformity. Laboratory investigations, including complete blood count, Erythrocyte Sedimentation Rate, and C-Reactive Protein, were within normal limits. Initial X-ray imaging revealed cortical lucency with surrounding sclerosis and mild cortical thickening in the midshaft of the right femur, which was initially interpreted as a possible stress fracture (Figure 1). The bone scintigraphy

demonstrated focal increased tracer uptake in the same region (Figure 2). Subsequent SPECT/CT precisely localized a cortical nidus with central lucency and surrounding sclerosis, confirming the diagnosis of osteoid osteoma (Figure 3).

Discussion

This case reports the presence of osteoid osteoma in 55 years old female patient presenting the challenge associated with its diagnosis in an elder female. The age and gender of the female in our case suggested suspicion of a stress fracture. However, the nocturnal pain relieved by NSAIDs and imaging (bone scan and SPECT-CT) favored osteoid osteoma. Osteoid osteoma is a benign osteogenic tumor that typically arises in adolescents and young adults, with a peak incidence in the second and third decades of life. Its occurrence in elderly women is extremely rare. Patel et al. [3] reported a unique case

of osteoid osteoma in the hand of a 77-year-old female, highlighting that the tumor can present even beyond the usual age range. With the present case, this observation broadens the clinical spectrum of osteoid osteoma in older females. It emphasizes the importance of including this entity in the differential diagnosis of chronic, unexplained musculoskeletal pain in elderly patients, even when the demographic profile does not fit the classical pattern.

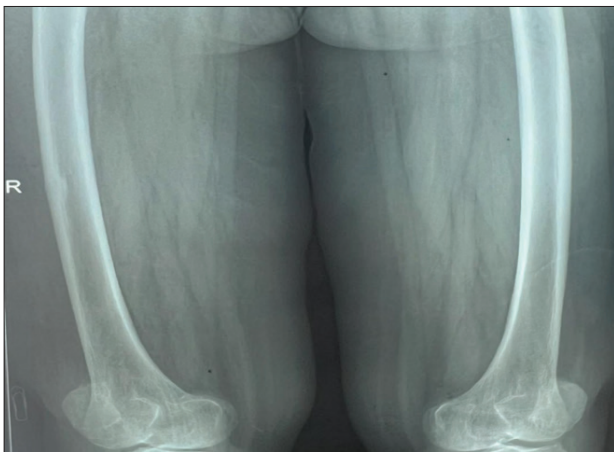


Figure 1. X-ray having cortical lucency.

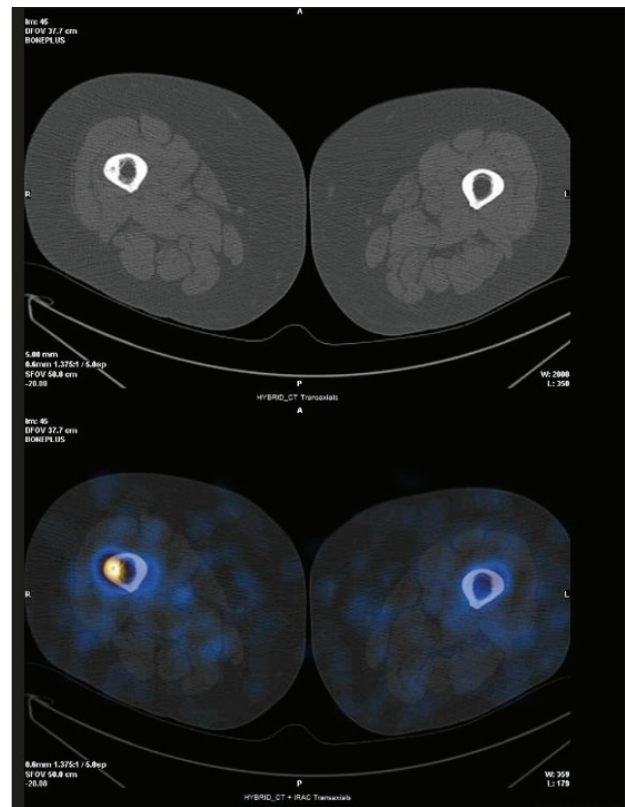


Figure 3. SPECT-CT of the patient.

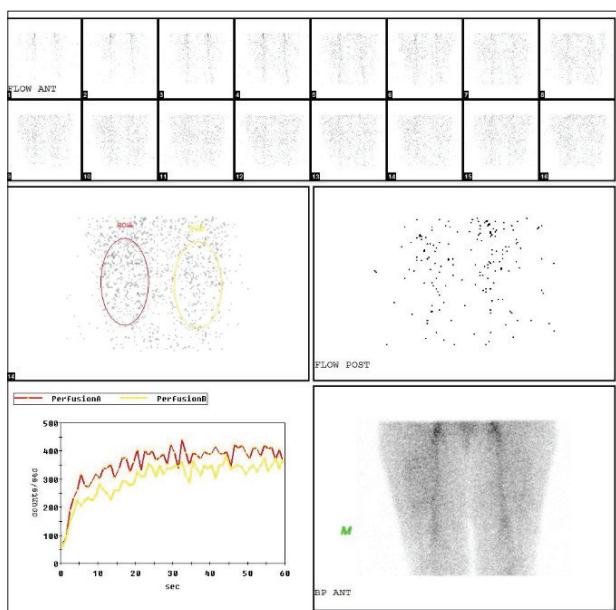


Figure 2. Three-phase bone scan.

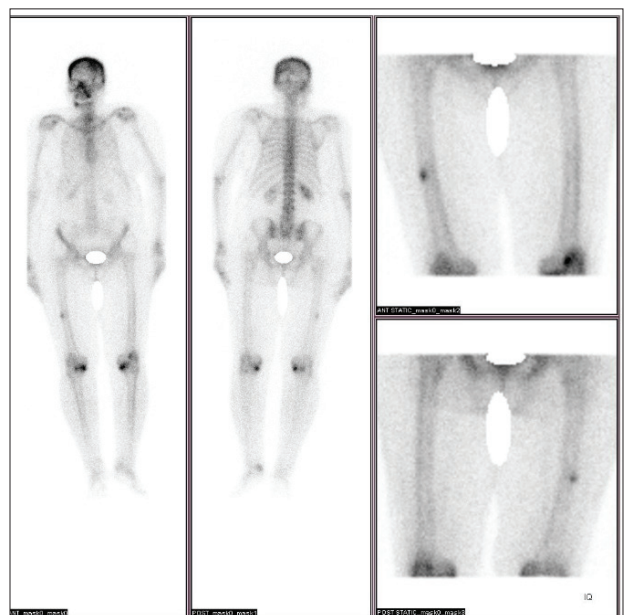


Table 1. Findings of osteoid osteoma – current case versus typical osteoid osteoma.

Feature	Typical osteoid osteoma Findings [1,2]	Current case findings
Location	Femur or tibia (usually unilateral)	Right midshaft femur (unilateral)
Clinical symptoms	Nocturnal pain relieved by NSAIDs	Right thigh pain, nocturnal, NSAID-responsive
X-ray	Small cortical lucent nidus with surrounding sclerosis	Cortical lucency with mild sclerosis, mimicking stress fracture
Bone scan	Focal increased uptake	Focal increased uptake
SPECT/CT	Precise nidus localization with surrounding sclerosis	Cortical nidus with central lucency and peripheral sclerosis
Rarity	Usually, young males	Older female

In the present case, the patient presented with nocturnal pain that was partially relieved by NSAIDs, alongside radiographic evidence of cortical lucency. While such findings in elderly patients often raise suspicion for conditions such as stress fractures, osteomyelitis, or metastatic disease, as noted by Ma et al. [2]. Similarly, Koga et al. [5] described a 70-year-old female whose imaging was initially inconclusive, but symptoms, including pain at night responsive to NSAIDs, led to further investigation and diagnosis of osteoid osteoma.

In the present case, the initial radiographic findings closely resembled a stress fracture, which is a more frequent consideration in elderly patients. This overlap highlights the diagnostic challenge of osteoid osteoma when it arises outside the typical age group. Patel et al. [3] have shown that three-phase bone scintigraphy is particularly sensitive in identifying osteoid osteoma, with the nidus appearing as a distinct focus of increased uptake on flow, blood pool, and delayed images. Such characteristic scintigraph findings can therefore play an essential role in distinguishing osteoid osteoma from other pathologies with similar radiographic appearances, supporting earlier and more accurate diagnosis.

Conclusion

Osteoid osteoma in elderly females is uncommon and can often mimic other conditions, such as stress fractures, on plain radiographs. Three-phase bone scintigraphy, along with SPECT-CT, is essential for accurately diagnosing atypical osteoid osteoma, preventing misdiagnosis, and ensuring timely and appropriate management.

List of Abbreviations

CRP	C-Reactive Protein
ESR	Erythrocyte Sedimentation Rate Methylene Diphosphonate
OPD	Outpatient Department
Tc-99m MDP	Technetium-99m

Conflict of interests

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent for publication

Due permission was obtained from the patient to publish the case and the accompanying images.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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